

Natural Farming: A Technique of Sustainable Horticultural Crop Production

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Abstract:

In India, over 100 million farmers operate on an average of 0.38 hectares (ha) of land, with over 85% of them being smallholders (MoA& FW, 2019). The majority of the world's impoverished and hungry people live on small farms and use low-input/low-yield farming techniques to make ends meet on scarce land (Hazell and Rahman, 2014). The only workable answer in this case is seen to be the application of cutting-edge technology and innovation in Indian agriculture. Modern chemical-based agriculture has increased production costs, reduced factor productivity, and depleted the base of environmental resources due to many causes (Singh et al., 2011). Recurring crops including rice, wheat, cotton, and sugarcane degrade soil fertility, render topsoil infertile, weaken soil vitality, and mostly lower the amount of beneficial soil microbes (Sreenivasa et al., 2010). Burning agricultural leftovers, applying pesticides, and using chemical fertilizers continuously might all be contributing factors to environmental pollution (Singh et al., 2021). According to Shaikh and Gachande (2015), their ongoing use reduces the micro- and macrofauna in the soil, which may have an immediate impact on the C-N ratio, soil enzymatic activity, and plant availability of nutrients.

Introduction:

A lot of attention was recently drawn to natural farming when it was declared in the Union Budget that one crore farmers would be introduced to it over the course of the next two years with the help of branding and certification. It will be implemented through gram panchayats that are willing and scientific institutions. Ten thousand need-based bio-input resource centers will also be developed. The government's choice to support natural farming is in line with its larger goals of rural rehabilitation and sustainable development. Budgetary



provisions for education, research, and financial incentives show a strong commitment to implementing natural farming methods nationwide. This change in legislation demonstrates how natural farming is becoming seen as a workable answer to many of the environmental and financial problems that Indian agriculture faces. The Prime Minister of India, Shri Narendra Modi, recently unveiled 109 high-yielding, climate-resilient, and biofortified crop varieties at the India Agricultural Research Institute in New Delhi on August 11, 2024. He also mentioned that important milestones are approaching as farmers are embracing natural farming more and more. In his speech on the 78th anniversary of Independence, he emphasized the need to change the agricultural industry and highlighted that the government has started initiatives to support natural farming and has boosted funding for these kinds of operations.

Principles:

The foundation of natural farming is the idea that one should cooperate with nature rather than try to manipulate it. Recycling on-farm biomass is a key component of this strategy, which also emphasizes mulching and enriching the soil using cow dung-urine mixtures. Natural farming strictly forbids the use of synthetic chemical inputs and places a high priority on soil aeration, which maintains the health of soil microorganisms. Additionally, this approach incorporates cattle, trees, and crops into a diverse agricultural system, boosting biodiversity and building a more robust farm environment. Natural farming aims to establish an agricultural paradigm that is both ecologically sustainable and self-sustaining by focusing on optimizing farm resources without the need of external inputs.

Benefits:

There are numerous and varied advantages to natural farming. Natural farming helps restore soil health and increases the amount of organic matter in the soil by doing away with the usage of artificial pesticides and fertilizers. Over time, this results in increased nutrient cycling, less erosion, and greater water retention—all of which raise and stabilize yields. Additionally, smallholder farmers find natural farming to be economically appealing due to the cost savings from fewer input purchases. Natural farming encourages rural development outside of the farm by reviving nearby villages and generating jobs. Natural farming produces produce that is frequently higher in nutrients and lower in chemical residues, satisfying the rising demand from consumers for wholesome, safe food. Natural farming operates under the premise that the nutrients required for plant development are naturally present in the soil. The



soil may naturally supply plants with the nutrients they require by enabling natural microbial cycles to operate as they do in intact ecosystems. In order to maintain this nutrient-rich environment, the main duty is to regularly refill the soil with organic matter that comes from the farm. Four pillars are suggested to support effective natural agricultural practices.

Challenges and Limitations:

Notwithstanding its many advantages, natural farming faces a number of noteworthy obstacles. It might be difficult to go from conventional to natural farming since it calls for a fundamental change in both agricultural methods and thinking. For farmers used to greater levels of productivity, this shift frequently means early losses in crop yields as the soil gradually recovers from years of chemical usage. This presents a financial risk. Furthermore, a consistent supply of natural inputs like organic matter and native seeds is essential to natural farming. Natural farming methods may be less successful and less scalable if these vital materials are in limited supply. In order to adopt and maintain these techniques, farmers may encounter challenges in gaining the technical know-how, getting access to markets, and getting funding. The effective scaling of natural farming depends on addressing these issues. Targeted assistance is needed to remove these obstacles, such as better educational opportunities, enhanced supply chains for organic inputs, and financial incentives to reduce transitional risk. By ensuring these conditions are met, natural farming may reach its full potential and develop into a sustainable agricultural method.

Components:

1. **Beejamrit:** A traditional method of sustainable agriculture is beejamrit. Seeds, seedlings, or any other planting material can be utilized with it. It works well at keeping fungi away from developing roots. Utilized as a seed treatment, beejamrit is a fermented microbial solution rich in microorganisms that are good to plants. It is anticipated that the advantageous microorganisms would infiltrate the seeds' roots and leaves and aid in the plants' healthy growth.

Inputs: 20 liters of water, 5 kg of cow dung, 5 liters of cow urine, 50 grams of lime, 1 kilogram of bund soil, and 100 kg of seed

Application as a seed treatment: Any crop's seeds can be treated with beejamrit by coating and manually mixing them before using them for planting. Leguminous seeds should be dipped briefly and allowed to dry as they may have thin seed coverings.

2. Jivamrit:

By encouraging the activity of soil-dwelling microorganisms as well as phyllospheric microorganisms when they are sprayed on leaves, Jivamrit functions as a biostimulant. It boosts the number of native earthworms and serves as a primer for microbial activity. Required inputs: 10 kg of fresh cow dung, 5–10 liters of cow urine, 50 grams of lime, 2 kg of jaggery, and 2 kg of flour made from pulses 200 liters of water and 1 kilogram of uncontaminated soil Implementing Jivamrit: Applying this combination once every two weeks is recommended. It need to be included into irrigation water or sprayed straight onto the crops. It should be used on individual plants when it comes to fruit plants. You can keep the combination in storage for up to 15 days.

3. Mulching:

Mulching is the process of covering the surface of the soil with a combination of living crops and straw (dead plant biomass) in order to retain moisture, lower the temperature of the soil near plant roots, stop soil erosion, lessen runoff, and inhibit the growth of weeds. Two kind of mulches exist:

- a. **Crop Residue Mulch:** This includes dry biomass waste and other dried plants, such as agricultural stubble. It protects the soil from harsh sunshine, extreme cold, rain, and other weather. Mulching with residue also protects seeds from animals, insects, and birds.
- b. **Live Mulch:** Creating multi-cropping or intercropping patterns with short-duration crops in the rows of a primary crop is the practice of live mulching. To supply all the necessary nutrients, it is recommended that the pattern consist of both monocotyledons and dicotyledons in the same field. While dicots, like pulses, fix nitrogen in the soil, monocots, like wheat and rice, provide minerals like phosphate, sulfur, and potash. These methods lessen the need for a certain kind of plant nutrient.

4. Whapsa:

The term "whapasa" refers to the mixing of 50% water vapor and 50% air in the space between two soil particles. The majority of the moisture and some of the nutrients that soil organisms and roots need are found in the microclimate of the soil. It improves



water usage efficiency, makes more water available, and strengthens resistance to drought.

Conclusion:

When done carefully, the use of contemporary technology into natural farming can improve its sustainability and efficiency without undermining its guiding principles. Natural farming can be made more robust, productive, and scalable by utilizing blockchain, AI, automation, and precision agriculture. This will ensure the practice's sustainability for future generations. To avoid overpowering or replacing natural processes, technology should be used in a balanced manner to improve and supplement them. Natural farming may develop further into a really sustainable and regenerative agricultural method in this way.

References:

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